

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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34,26216 -117,3139

R-5

REPLY TO: 3420 Biological Evaluation

February 28, 1980

SUBJECT: Biological Evaluation, Breezy Point Fuelbreak

TO: Forest Supervisor, San Bernardino N.F.



Gregg DeNitto, pathologist, and Dave Schultz, entomologist, from the FIDM Staff examined the Breezy Point shaded fuelbreak on February 20, 1980.

Five aggregates of trees were examined specifically for growth rate and basal area. The five areas were selected because they appeared typical of the "denser" aggregates.

The basal areas were: 160 sq. ft./ac.
240 " " "
260 " " "
240 " " "
220 " " "

This is an average basal area of approximately 220 sq. ft./ac. using a 20 factor prism. An optimal basal area in the areas examined to prevent future bark beetle-caused mortality would be about 100-120 sq.ft./ac. Although there is very little brush or reproduction to compete with the overstory, grass is quite abundant and can compete for the available soil moisture. The original harvesting plan to remove about one-half of the trees would probably bring the basal area within the optimal range to prevent bark beetle-caused losses and would also bring the stocking to a level considered desirable by the San Bernardino N.F. Silviculturist.

Increment cores were taken from one tree in each of the aggregates examined (total of 5 trees) and the growth rate was determined for the most recent 3 inches of growth (10 power lens used) (Table 1). In general, growth has slowed considerably in the past 25 to 30 years. Due to the age and size of the trees, thinning may not result in a dramatic release of the residual stand, but it should maintain or increase the vigor of the trees sufficiently to keep pest-caused losses to a minimum.

Table 1. Increment Growth of Selected Pinus ponderosae on Breezy Point Fuelbreak, San Bernardino N.F.

Tree No.	Number of Rings		
	Inch Nearest Bark	Second Inch From Bark	Third Inch From Bark
1	22	9	10
2	29	13	17
3	27	12	10

4	17	14	9
5	32	13	6
Rounded Avg.	25	12	10

The effects of the currently high basal area can already be seen in the fuelbreak. Many of the trees have rounded crowns and very poor needle retention, signs of low vigor. Many of these same trees have already been attacked by the red turpentine beetle, Dendroctonus valens, and twig beetles, Pityophthorus spp. These beetles are normally not major tree killing insects, but their presence is indicative of low tree vigor. The activity of these beetles will further weaken the trees and predispose them to more serious pests resulting in mortality.

Another predisposing factor present in the fuelbreak is oxidant air pollution (ozone). Most of the foliage in the fuelbreak was out of reach due to pruning, but several of the smaller trees had distinct ozone symptoms on the foliage. Although there are probably no actions that could be taken to reduce the ozone level in the fuelbreak, it should be recognized that it is present and places an additional stress on the trees. Any actions that reduce the other stresses on the trees, such as thinning, will help to offset the effects of ozone injury. Also, since incense-cedar is apparently more tolerant of ozone than ponderosa pine, it may be favored as a species.

A problem that is fairly widespread in the fuelbreak is the occurrence of annosus root rot, caused by Fomes annosus Fr. The majority of the old stumps checked contained sporophores (fruiting bodies) of the fungus. Fomes annosus becomes established in a stand when spores land on a fresh wound or a freshly cut conifer stump. After the spore germinates, the fungus grows into the root system. If an infected root is in contact with the roots of a nearby live conifer, the fungus may infect the latter also. All species of conifers are apparently susceptible to infection by Fomes annosus. Of the tree species present in the fuelbreak, the pines are most likely to die soon after infection. Infected incense-cedars are less likely to suffer mortality until most of their root systems are decayed. Incense-cedars that are infected with Fomes annosus could present a hazard if they are in an area used by recreationists. As a result of their tolerance to infection and their retention of green foliage, they may be overlooked until their root system is well-decayed and wind throw occurs.

A treatment that is 95% effective in preventing new annosus centers from becoming established is to cover freshly cut conifer stumps with granular borax within 4 hours of cutting. Borax treatment will have no effect on existing infection centers, but it will prevent new centers from becoming established. Borax treatment of all freshly cut conifer stumps in the four southern California National Forests is recommended in the R-5 supplement to the 2700 section (recreation section) of the Forest Service Manual. A pesticide-use request and an Environmental Assessment are required for this treatment.

Hardwoods are generally resistant to Fomes annosus and this provides another alternative for managing the fuelbreak. The native oaks can be favored in any thinnings and they will provide a tree cover that is extremely resistant to Fomes annosus. They can also function as a natural barrier to spread of the fungus around existing centers.

Management Options

1. Do not thin. Tree vigor can be expected to decline. Insects and diseases will cause mortality in the future until one-half or more of the stand is dead. Much of the mortality could come in one or two years of less than adequate precipitation.
2. Remove one-third of the trees in the fuelbreak. If the trees removed were those showing signs of low vigor (flat tops, rounded crowns, low live crown ratio, poor needle retention), then the residual stand should show some improvement in vigor and mortality should be tolerable for a period of a decade.
3. Remove currently marked trees. Many of the currently marked trees are those showing signs of low vigor or are located in the more heavily stocked aggregates. If they are all removed, the area should be at the maximum stocking level for long term (10-20 years) survival. Mortality may still occur on the edges of Fomes annosus infection centers.
4. Manage for Fomes annosus control. This option can be done in conjunction with either options 2 or 3. Treating freshly cut stumps with borax should prevent the establishment of almost all new infection centers. Favoring, releasing, and encouraging the establishment of native oaks should aid in the rehabilitation of existing infection centers. Since the fungus is rather persistent, infection centers should not be planted with conifers.

If you have any questions or require further assistance, please contact our office.



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